August 2018

HYDROLOGICAL REVIEW SUMMARY

The form is to be completed by the Professional that prepared the Hydrological Review.
Use of the form by the City of Toronto is not to be construed as verification of engineering/hydrological content.

Refer to the Terms of Reference, Hydrological Review:
Link to Terms of Reference Hydrological Review

For City Staff Use Only:	
Name of ECS Case Manager (Please print)	
Date Review Summary provided to to TW, EM&P	

IF ANY OF THE REQUIREMENTS LISTED BELOW HAVE NOT BEEN INLCUDED IN THE HYDROLOGICAL REVIEW, THE REVIEW WILL BE CONSIDERED INCOMPLETE.
THE GREY SHADED BOXES WILL REQUIRE A CONSISTANCY CHECK BY THE ECS CASE MANAGER.

Summary of Key Information:

SITE INFORMATION		**Page # & Section # of Review**	**Review Includes this Information City Staff (Check)**
Site Address	25 & 35 Queens Quay East, Toronto, Ontario	Page 1 Section 1.0	
Postal Code	M5E 0A4	Page 1 Section 1.0	
Property Owner (on request for comments memo)	Pier 27 Toronto (Northeast)	Page 2-3 Section 1.4	
Proposed description of the project (if applicable) (point towers, number of podiums)	Forty-five [45] storey building with a 11 storey podium and a eleven [11] storey building	Page 2 Section 1.3	
Land Use (ex. commercial, residential, mixed, institutional, industrial)	Mixed residential/commercial	Page 2 Section 1.3	
Number of below grade levels for the proposed structure	Four [4]	Page 2 Section 1.3	
HYDROLOGICAL REVIEW INFORMATION			
Date Hydrological Review was prepared:	March 1, 2021	Page 22 Section 9.0	
Who Performed the Hydrological Review (Consulting Firm)	McClymont and Rak Engineers Inc.	Page 22 Section 9.0	
Name of Author of Hydrological Review	Lad Rak, P.Eng., M.Eng., QP_{ESA}	Page 22 Section 9.0	

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Check the directories on the website for Professional Geoscientists and/or Professional Engineers of Ontario been checked to ensure that the Hydrological Report has been prepared by a qualified person who is a licensed Professional Geoscientist as set out in the Professional Geoscientist Act of Ontario or a Professional Engineer? PEO: Professional Engineers of Ontario APGO: Association of Professional Geoscientists of Ontario	Yes	N/A	
Has the Hydrological Review been prepared in accordance with all the following: • Ontario Water Resources Act • Ontario Regulation 387/04 • Toronto Municipal Code Chapter 681-Sewers	Ontario Water Resources Act Toronto Municipal Code Chapter 681 – Sewers Ontario Regulation 387/04	Page 6 Section 3.2 Page 7 Section 3.5 Page 15 Section 5.3	
		Page # & Section # of every occurrence in the Review	**Review Includes this Information City Staff (Check)**

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Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **with safety factor included**	What safety factor was used? Steady State discharge = 249,000 L/day with a safety factor of 1.5 Maximum discharge = 459,000 L/day	Page 13 Section 5.1.1 Table 4	
Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **without safety factor included**	Steady State discharge = 166,000 L/day without the safety factor	-	
Total Volume (L/day) Long Term drainage of groundwater (from foundation drainage, weeping tiles, sub slab drainage) **with safety factor included** If the development is part of a multiple tower complex, include total volume for each separate tower	What safety factor was used? Steady State discharge = 31,000 L/day with a safety factor of 1.0 Peak flow rate = 46,000 L/day with a safety factor of 1.5	Page 14 Section 5.2.1 Table 5	
List the nearest surface water (river, creek, lake)	Lake Ontario	Page 16 Section 5.5	

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SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Lowest basement elevation	63.24 masl	Page 2 Section 1.3	
Foundation elevation	61.75 masl	Page 11 Section 5.1	
Ground elevation	77.30 masl	Page 2 Section 1.3	
STUDY AREA MAP		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
Study area map(s) have been included in the report.	Borehole Location Plan	Drawing No. 1	
Study area map(s) been prepared according to the Hydrological Review Terms of Reference.	☑ **Yes**	Drawing No. 1	N/A
WATER LEVEL AND WELLS		**Page # & Section # of every occurrence**	**Review Includes this Information (City Staff Initial)**

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SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
		in the Review	
The groundwater level has been monitored using all wells located on site (within property boundary).	Yes	Page 9-10 Section 4.2	
The static water level measurements have been monitored at all monitoring wells for a minimum of 3 months with samples taken every 2 weeks for a minimum of 6 samples. The intent is for the qualified professional to use professional judgement to estimate the seasonally high groundwater level.	Groundwater levels were monitored from September to October as part of the 6 rounds of water level readings The overall average groundwater elevation is 72.06 masl (Table 1) The dewatering calculations are conservatively based on the September 28 reading of 72.11 masl (Table 3)	Page 8-9 Section 4.1 Page 9-10 Section 4.2 Table 1 Table 3	
All water levels in the wells have been measured with respect to masl.	Yes	Page 9-10 Section 4.2 Table 1	
A table of geology/soil stratigraphy for the property has been included.	Yes	Page 8-9 Section 4.1	
GEOLOGY AND PHYSICAL HYDROLOGY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information (City Staff Initial)**
The review has made reference to the soil materials including thickness, composition and texture, and bedrock environments.	Yes	Page 8-9 Section 4.1	
Key aquifers and the site's proximity to nearby surface water has been identified.	☑ **Yes**	Page 16 Section 5.5	N/A

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SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
PUMP TEST/SLUG TEST/DRAWDOWN ANALYSIS		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
A summary of the pumping test data and analysis is included in the review.	No pump test completed	-	
The pump test been carried out for at least 24 hours if possible. If not, has a slug test been conducted?	Slug test completed by InSitu Contractors Inc.	Appendix E	
Have the monitoring well(s) have been monitored using digital devices? If yes how frequently?	Water levels were measured manually	Page 9-10 Section 4.2	
If a slug or pump test has been conducted has the static groundwater level been monitored at all monitoring well(s) multiple times to measure recovery? -prior to the slug or pumping test(s)? -post slug or pumping test(s)?	☑ **Yes** Prior to slug test	Appendix E	N/A
The above noted slug or pump tests have been included in the report.	☑ **Yes**	Appendix E	
WATER QUALITY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**

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The report includes baseline water quality samples from a laboratory. The water quality must be analyzed for all parameters listed in Tables 1 and 2 of Chapter 681 Sewers of the Toronto Municipal Code (found in Appendix A) and the samples must have to be taken unfiltered within 9 months of the date of submission.	Yes	Page 10 Section 4.3 Table 2	
The water quality data templates in Appendix A have been completed for each sample taken for both sanitary/combined and storm sewer limits.	For sanitary discharge- See the sanitary/combined sewer parameter limit template Yes For storm discharge- See the storm sewer parameter limit template Yes	Table 2 Appendix D	
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the sanitary/combined Bylaw limits **If there are any sample parameter Exceedances the groundwater can't be discharged as is.**	Sample collected from BH20-5S: No exceedances recorded	Page 10 Section 4.3 Table 2	
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the storm Bylaw limits. **If there are any sample parameter exceedances the groundwater can't be discharged as is.**	Sample collected from BH20-5S: Total Cyanide (0.17 mg/L vs. 0.02 mg/L) Total Manganese (0.208 mg/L vs. 0.05 mg/L) Total Zinc (0.065 mg/L vs. 0.04 mg/L)	Page 10 Section 4.3 Table 2	
The water quality samples have been analyzed by a Canadian laboratory accredited and licensed by Standards Council of Canada and/or Canadian Association for Laboratory Accreditation.	☑ **Yes**	Page 7 Section 3.5 Appendix D	N/A

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SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
List of Canadian accredited laboratories: Standards Council of Canada	ALS Laboratory is certified by the Canadian Association for Laboratory Accreditation (CALA) for chemical analysis	Page 7 Section 3.5 Appendix D	
A chain of custody record for the samples is included with the report.	Yes	Appendix D	
Has the chain of custody reference any filtered sample? If yes, the report has to be amended and re-submitted to include only non-filtered samples.	No	Page 7 Section 3.4	
List any of the sample parameters that exceed the Bylaw limits with the reporting detection limit (RDL) included.	Cyanide **Reporting Detection Limit (RDL)**: 0.002 mg/L Manganese RDL: 0.00050 mg/L Zinc RDL: 0.030 mg/L	Appendix D	
A true copy of the Certificate of Analysis report, is included with the report.	Yes	Appendix D	
EVALUATION OF IMPACT		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
Does the report recommend a back-up system or relief safety valve(s)? Does the associated Geotechnical report recommend a back-up system or relief safety valve(s)?	☐ **Yes** ☑ **No** ☐ **Yes** ☑ **No**	-	
The taking and discharging of groundwater on site has been analyzed to ensure that no negative	☑ **No**	-	N/A

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SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
impacts will occur to the City sewage works in terms of quality and quantity (including existing infrastructure), the natural environment, and settlement issues.	The report has not conducted induced settlement calculations	-	
Has it been determined that there will be a negative impact to the natural environment, City sewage works, or surrounding properties has the study identified the following: the extent of the negative impact, the detail of the precondition state of all the infrastructure, City sewage works, and natural environment within the effected zone and the proposed remediation and monitoring plan?	☐ **Yes** **If yes, identify impact:** ☑ **No**	-	N/A

Summary of Additional Information and Key Items (if applicable):

Appendix A:

SANITARY/COMBINED **Sample Location: BH20-5S**

Inorganics		Sample Result	Sample Result with upper RDL included	
Parameter	mg/L			ug/L
BOD	300	<3.0	<3.0	300,000
Fluoride	10	0.730	0.730	10,000
TKN	100	8.57	8.57	100,000
pH	6.0 - 11.5	8.01	8.01	6.0 - 11.5
Phenolics 4AAP	1	<0.0010	<0.0010	1,000
TSS	350	7.6	7.6	350,000
Total Cyanide	2	0.17	0.17	2,000
Metals				
Chromium Hexavalent	2	<0.00050	<0.00050	2,000
Mercury	0.01	0.00	0.00	10
Total Aluminum	50	2.090	2.090	50,000
Total Antimony	5	0.00190	0.00190	5,000
Total Arsenic	1	0.00910	0.00910	1,000
Total Cadmium	0.7	0.000067	0.000067	700
Total Chromium	4	<0.0050	<0.0050	4,000
Total Cobalt	5	0.00230	0.00230	5,000
Total Copper	2	0.0055	0.0055	2,000
Total Lead	1	0.02310	0.02310	1,000
Total Manganese	5	0.2080	0.2080	5,000
Total Molybdenum	5	0.00708	0.00708	5,000
Total Nickel	2	0.00630	0.00630	2,000
Total Phosphorus	10	0.1220	0.1220	10,000
Total Selenium	1	<0.00050	<0.00050	1,000
Total Silver	5	<0.00050	<0.00050	5,000
Total Tin	5	0.00110	0.00110	5,000
Total Titanium	5	0.07720	0.07720	5,000
Total Zinc	2	0.0650	0.0650	2,000
Animal/Vegetable Oil & Grease	150	<5.0	<5.0	150,000
Mineral/Synthetic Oil & Grease	15	<2.5	<2.5	15,000

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Volatile Organics		**Sample Result**	**Sample Result with upper RDL included**	
Parameter	**ug/L**			**mg/L**
Benzene	10	<0.50	<0.50	0.01
Chloroform	40	<1.0	<1.0	0.04
1,2-Dichlorobenzene	50	<0.50	<0.50	0.05
1,4-Dichlorobenzene	80	<0.50	<0.50	0.08
Cis-1,2-Dichloroethylene	4,000	<0.50	<0.50	4
Trans-1,3-Dichloropropylene	140	<0.50	<0.50	0.14
Ethyl Benzene	160	<0.50	<0.50	0.16
Methylene Chloride	2,000	<2.0	<2.0	2
1,1,2,2-Tetrachloroethane	1,400	<0.50	<0.50	1.4
Tetrachloroethylene	1,000	<0.50	<0.50	1
Toluene	16	<0.50	<0.50	0.016
Trichloroethylene	400	<0.50	<0.50	0.4
Total Xylenes	1,400	<1.1	<1.1	1.4
Semi-Volatile **Organics**				
Di-n-butyl Phthalate	80	<1.0	<1.0	0.08
Bis (2-ethylhexyl) Phthalate	12	<2.0	<2.0	0.012
3,3'-Dichlorobenzidine	2	<0.40	<0.40	0.002
Pentachlorophenol	5	<1.0	<1.0	0.005
Total PAHs	5	<1.7	<1.7	0.005
Misc **Parameters**				
Nonylphenols	20	<1.0	<1.0	0.02
Nonylphenol Ethoxylates	200	<2.0	<2.0	0.2

Sample Collected: September 30, 2020
Temperature: 17.2°

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STORM **Sample Location: BH20-5S**

Inorganics		Sample Result	Sample Result with upper RDL included	
Parameter	mg/L			ug/L
pH	6.0 - 9.5	8.01	8.01	
BOD	15	<3.0	<3.0	15,000
Phenolics 4AAP	0.008	<0.0010	<0.0010	8
TSS	15	7.6	7.6	15,000
Total Cyanide	0.02	0.17	0.17	20
Metals				
Total Arsenic	0.02	0.00910	0.00910	20
Total Cadmium	0.008	0.000067	0.000067	8
Total Chromium	0.08	<0.0050	<0.0050	80
Chromium Hexavalent	0.04	<0.00050	<0.00050	40
Total Copper	0.04	0.0055	0.0055	40
Total Lead	0.12	0.02310	0.02310	120
Total Manganese	0.05	0.2080	0.2080	50
Total Mercury	0.0004	0.0000227	0.0000227	0.4
Total Nickel	0.08	0.00630	0.00630	80
Total Phosphorus	0.4	0.1220	0.1220	400
Total Selenium	0.02	<0.00050	<0.00050	20
Total Silver	0.12	<0.00050	<0.00050	120
Total Zinc	0.04	0.065	0.065	40
Microbiology				
E.coli	200	1	1	200,000
Volatile Organics				
Parameter	ug/L			mg/L
Benzene	2	<0.50	<0.50	0.002
Chloroform	2	<1.0	<1.0	0.002
1,2-Dichlorobenzene	6	<0.50	<0.50	0.0056
1,4-Dichlorobenzene	7	<0.50	<0.50	0.0068
Cis-1,2-Dichloroethylene	6	<0.50	<0.50	0.0056
Trans-1,3-Dichloropropylene	6	<0.50	<0.50	0.0056
Ethyl Benzene	2	<0.50	<0.50	0.002
Methylene Chloride	5	<2.0	<2.0	0.0052
1,1,2,2-Tetrachloroethane	17	<0.50	<0.50	0.017
Tetrachloroethylene	4	<0.50	<0.50	0.0044
Toluene	2	<0.50	<0.50	0.002
Trichloroethylene	8	<0.50	<0.50	0.0076
Total Xylenes	4	<1.1	<1.1	0.0044

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Semi-Volatile Organics		Sample Result	Sample Result with upper RDL included	
Di-n-butyl Phthalate	5	<1.0	<1.0	0.015
Bis (2-ethylhexyl) Phthalate	8.8	<2.0	<2.0	0.0088
3,3'-Dichlorobenzidine	0.8	<0.40	<0.40	0.0008
Pentachlorophenol	2	<1.0	<1.0	0.002
Total PAHs	2	<1.7	<1.7	0.002
PCBs	0.4	<0.040	<0.040	0.0004
Misc Parameters				
Nonylphenols	1	<1.0	<1.0	0.001
Nonylphenol Ethoxylates	10	<2.0	<2.0	0.01

Sample Collected: September 30, 2020
Temperature: 17.2°

Consulting Firm that prepared Hydrological Report: McClymont & Rak Engineers Inc

Qualified Professional who completed the report summary: Lad Rak, P.Eng., M.Eng., QP_{ESA}
Print Name

Qualified Professional who completed the report summary: March 1, 2021
Signature Date & Stamp